

CLAIMS

The embodiments of an invention in which an exclusive property or right is claimed are defined as follows:

1. A device comprising a top surface and a bottom surface, said device having a
5 through wafer via extending from said top surface to said bottom surface, said device
also comprising an optoelectronic structure , and an ion implanted isolation moat,
wherein said optoelectronic structure and said through wafer via are enclosed within
said isolation moat.
- 10 2. The device of claim 1 wherein the optoelectronic structure is either a PIN
photodetector or a vertical cavity surface emitting laser.
3. The device of claim 2 wherein the optoelectronic structure is a vertical cavity
surface emitting laser.
- 15 4. The device of claim 1 additionally comprising at least two anodes, wherein one
is positioned on said top surface of said device and the other is positioned on said
bottom surface of said device.
- 20 5. The device of claim 4, wherein the two anodes are electrically connected
through the through wafer via.
6. The device of claim 5, wherein the electrical connection through the through
wafer via is accomplished by use of a conductive material.
- 25 7. The device of claim 6, wherein the conductive material is a conductive metal.
8. The device of claim 7, wherein the conductive metal is deposited on the inner
walls of the through wafer via.

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9. The device of claim 8, wherein the conductive metal is gold.
10. The device of claim 1, additionally comprising an area of ion implantation positioned underneath the isolation moat.
- 5 11. The device of claim 10, wherein the ion implantation is hydrogen ion implantation.
12. A device having a top and bottom surface comprising:
- 10 (a) a vertical cavity surface emitting laser;
- (b) at least two anodes positioned on said top and bottom surfaces of the device;
- (c) a through wafer via extending from said top surface to said bottom surface, wherein said through wafer via has inner walls having an electrically
- 15 conductive material deposited thereon to electrically connect said at least two anodes;
- (d) an ion implanted isolation moat positioned to enclose said vertical cavity surface emitting laser and said through wafer via; and
- (e) a moat ion implantation region positioned below said isolation moat.
- 20 13. A method of producing a device comprising the steps of:
- (a) forming an optoelectronic structure;
- (b) forming a through wafer via extending from a top surface to a bottom surface of said device;
- (c) forming an isolation moat in said device, wherein said through wafer via
- 25 and said optoelectronic structure are enclosed by said isolation moat.
14. The method of claim 13, wherein said optoelectronic structure is a vertical cavity surface emitting laser.

15. The method of claim 13, additionally comprising the step of forming at least two anodes, positioned on said top and bottom surfaces of said device.

16. The method of claim 15, additionally comprising the step of electrically
5 connecting said two anodes through the through wafer via.

17. The method of claim 16, wherein the step of electrically connecting said two anodes through the through wafer via comprises coating the inner walls of said through wafer via with an electrically conductive material.
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18. The method of claim 17, wherein the conductive material is a conductive metal.

19. The method of claim 18, wherein the conductive metal is gold.

15 20. The method of claim 13, wherein said through wafer via is formed with Reactive Ion Etching (RIE).

21. The method of claim 13, wherein said isolation moat is formed with Reactive Ion Etching.
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22. The method of claim 13, additionally comprising the step of implanting ions in said device into a region beneath the isolation moat.

23. The method of claim 22, wherein said ion implantation implants hydrogen ions.
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